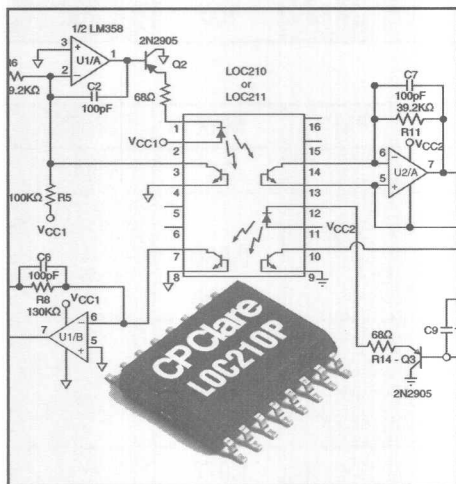


# LOC210P/LOC211P

## Linear Optocouplers



### DESCRIPTION

CP Clare's LOC210P and LOC211P provide two independent linear optocouplers in 16 pin SOIC packages. Each optocoupler in the dual LOC210P and LOC211P packages features an infrared LED optically coupled with two phototransistors. One input phototransistor is used to generate the servo control signal that compensates for the nonlinear time and temperature characteristics of the LED. The second phototransistor provides an output signal that is linear with respect to the servo LED current. The compensated optocouplers achieve a better than 0.01% servo linearity and greater than 200kHz bandwidth. The LOC210P and LOC211P dual optocouplers provide better than 87dB THD and 3750V<sub>RMS</sub> input/output isolation.

### FEATURES

- Small 16 pin SOIC package (PCMCIA Compatible)
- Couples analog and digital signals
- Wide bandwidth (>200kHz)
- High gain stability
- Low input/output capacitance
- Low power consumption
- 5300 VAC peak input/output isolation available
- 0.01% servo linearity
- THD 87dB typical
- UL recognized file #: E76270
- CSA file #: LR43639-12
- BSI certified to
  - BS EN 60950: 1992 (BS7002:1992) Certificate #: 7969
  - BS EN 41003: 1993 Certificate #: 7969

### APPLICATIONS

- Modem transformer replacement with no insertion loss
- Digital telephone isolation
- Power supply feedback voltage sensor
- Medical sensor isolation
- Audio signal interfacing
- Isolation of process control transducers

### RATINGS (@ 25°C)

| Parameter                              | Min  | Typ | Max              | Units            |
|----------------------------------------|------|-----|------------------|------------------|
| Input Power Dissipation                | -    | -   | 150 <sup>1</sup> | mW               |
| Input Control Current                  | -    | -   | 100              | mA               |
| Peak (10ms)                            | -    | -   | 1                | A                |
| Total Package Dissipation              | -    | -   | 800 <sup>2</sup> | mW               |
| Isolation Voltage                      |      |     |                  |                  |
| Input to Output                        | 3750 | -   | -                | V <sub>RMS</sub> |
| Operational Temperature                | -40  |     | +85              | °C               |
| Storage Temperature                    | -40  | -   | +125             | °C               |
| Soldering Temperature (10 Seconds Max) |      |     | +260             | °C               |

<sup>1</sup> Derate Linearly 1.33 mW/°C

<sup>2</sup> Derate Linearly 1.67 mW/°C

For additional information ask for our LOC Series Application Note No. 1003.  
For detailed information on CP Clare Semiconductor Group Products ask for our Catalog "SSP15"

**Input Characteristics @ 25°C<sup>1</sup>**

| PARAMETERS               | CONDITIONS                   | SYMBOL    | MIN | TYP | MAX | UNITS         |
|--------------------------|------------------------------|-----------|-----|-----|-----|---------------|
| LED Voltage Drop         | $I_F = 2\text{-}10\text{mA}$ | $V_F$     | 0.9 | 1.2 | 1.4 | V             |
| Input/Output Capacitance |                              | $C_{I/O}$ | -   | 3   | -   | pF            |
| Reverse LED Current      | $V_R = 5\text{V}$            | $I_R$     | -   | -   | 10  | $\mu\text{A}$ |
| Reverse LED Voltage      |                              | $V_R$     | -   | -   | 5   | V             |
| Forward LED Current      |                              | $I_F$     | -   | -   | 100 | mA            |

**Coupler/Detector Characteristics @ 25°C<sup>1</sup>**

| PARAMETERS                                          | CONDITIONS                                                            | SYMBOL               | MIN   | TYP   | MAX   | UNITS     |
|-----------------------------------------------------|-----------------------------------------------------------------------|----------------------|-------|-------|-------|-----------|
| Dark Current                                        | $I_F = 0\text{mA}$ , $V_{CC} = 15\text{V}$                            | $I_D$                | -     | 1     | 25    | nA        |
| K1, Servo Gain ( $I_1/I_F$ )                        |                                                                       |                      |       |       |       |           |
| LOC210P                                             | $I_F = 2\text{-}10\text{mA}$ , $V_{CC} = 15\text{V}$                  | K1                   | 0.004 | -     | 0.030 | -         |
| LOC211P                                             | $I_F = 2\text{-}10\text{mA}$ , $V_{CC} = 15\text{V}$                  | K1                   | 0.008 | -     | 0.030 | -         |
| K2, Forward Gain ( $I_2/I_F$ )                      |                                                                       |                      |       |       |       |           |
| LOC210P                                             | $I_F = 2\text{-}10\text{mA}$ , $V_{CC} = 15\text{V}$                  | K2                   | 0.004 | -     | 0.030 | -         |
| LOC211P                                             | $I_F = 2\text{-}10\text{mA}$ , $V_{CC} = 15\text{V}$                  | K2                   | 0.006 | -     | 0.030 | -         |
| K3, Transfer Gain ( $K_2/K_1$ )                     | $I_F = 2\text{-}10\text{mA}$ , $V_{CC} = 15\text{V}$                  | K3                   | 0.733 | -     | 1.072 | -         |
| $\Delta K3$ , Transfer Gain Linearity (non-servoed) | $I_F = 2\text{-}10\text{mA}$                                          | $\Delta K3$          | -     | -     | 1.0   | %         |
| K3 Temperature Coefficient                          | $I_F = 2\text{-}10\text{mA}$ , $V_{det} = -5\text{V}$                 | $\Delta K3/\Delta T$ | -     | 0.005 | -     | %/°C      |
| Common Mode Rejection Ratio                         | $V = 20\text{V}_{P-P}$ , $R_L = 2\text{K}\Omega$ , $F = 100\text{Hz}$ | CMRR                 | -     | 130   | -     | dB        |
| Input/Output Isolation                              |                                                                       | I/O                  | 3750  | -     | -     | $V_{RMS}$ |
| Total Harmonic Distortion                           | $F_0 = 350\text{Hz}$ , 0dBm                                           | THD                  | -96   | -87   | -80   | dB        |
| Frequency Response                                  | Photoconductive Operation                                             | BW (-3dB)            | -     | 200   | -     | kHz       |
|                                                     | Photovoltaic Operation                                                | BW (-3dB)            | -     | 40    | -     | kHz       |

<sup>1</sup> All parameters above are for each optocoupler

**K3 Sorted Bins**

Bin 1 = 0.773 - 0.886

Bin 2 = 0.887 - 1.072

**Part Number Information**

The LOC210P and LOC211P are shipped in antistatic tubes (50 pieces each) or tape/reel (1,000 pieces each). Each container has only 1 bin combination which will be branded on each part with the appropriate bin letter K, L, M, or N in the lower right hand corner. Suffix representation is described in the "Bin Matrix".

**Example:**

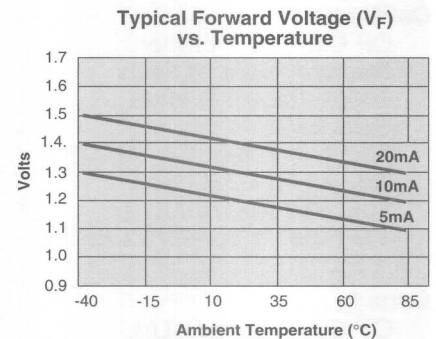
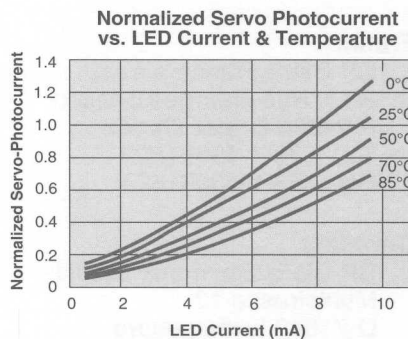
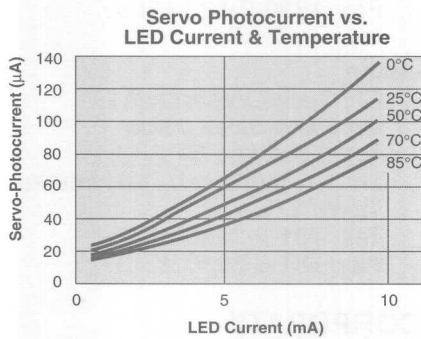
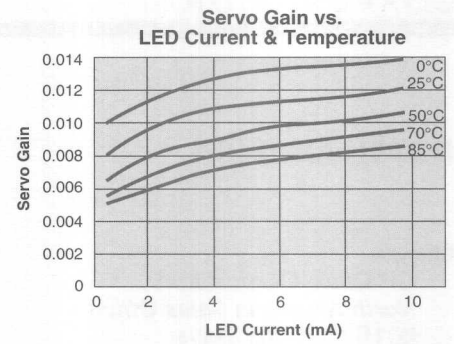
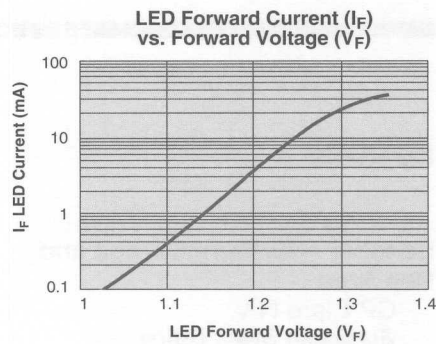
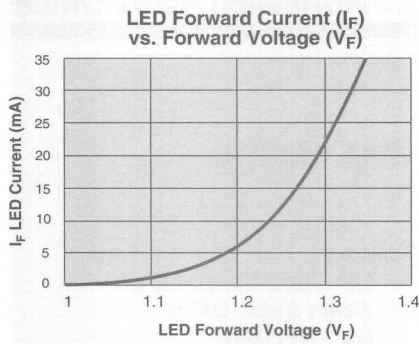
**Bin Matrix**

| Suffix | Bin                   |                           |
|--------|-----------------------|---------------------------|
|        | Top Pole Optocoupler* | Bottom Pole Optocoupler** |
| K      | 1                     | 1                         |
| L      | 1                     | 2                         |
| M      | 2                     | 1                         |
| N      | 2                     | 2                         |

\*Top Pole Optocoupler: Pins 1, 2, 3, 4, 13, and 14

\*\*Bottom Pole Optocoupler: Pins 7 through 12

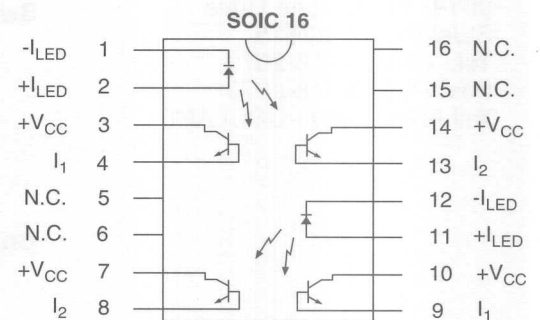
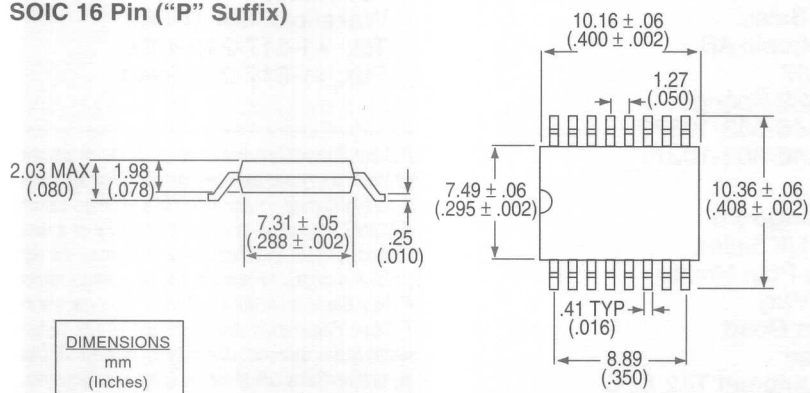
For additional information ask for our LOC Series Application Note No. 1003.  
 For detailed information on CP Clare Semiconductor Group Products ask for our Catalog "SSP15"



## MECHANICAL DIMENSIONS

## PACKAGE PINOUT

### SOIC 16 Pin ("P" Suffix)



For additional information ask for our LOC Series Application Note No. 1003.  
For detailed information on CP Clare Semiconductor Group Products ask for our Catalog "SSP15"

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